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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,454	10/31/2003	Kim B. Saulsbury	59056US002	9590
32692 7590 05/23/2007 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			EXAMINER ONEILL, KARIE AMBER	
			ART UNIT 1745	PAPER NUMBER
			NOTIFICATION DATE 05/23/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LegalUSDocketing@mmm.com  
LegalDocketing@mmm.com

## Office Action Summary

Application No.

10/699,454

Applicant(s)

SAULSBURY ET AL.

Examiner

Karie O'Neill

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-90 is/are pending in the application.
- 4a) Of the above claim(s) 24-43, 64-70, 78-90 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 15-23, 44-54, 56-63, 71 and 74-77 is/are rejected.
- 7) ☒ Claim(s) 13, 14, 55, 72 and 73 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. The Applicant's amendment filed on March 5, 2007, was received. None of the Claims were amended.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on November 28, 2006.

### ***Claim Rejections - 35 USC § 102***

3. The Claim rejections under 35 U.S.C. 102(e), with regard to Claims 1-3, 8, 11-16, 19, 21, 44, 46-47, 53-55, 57, 60-61 and 71-74 as being anticipated by Sugita et al. (US 6,620,540) are withdrawn, because the arguments were found persuasive.
4. The rejection of Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 under 35 U.S.C. 102(b) as being anticipated by Gibb et al. (US 5,484,666) are maintained. The rejection is repeated below for convenience.

With regard to Claim 1, Gibb et al. disclose, in Figure 1, a fuel cell assembly (10), comprising: a plurality of fuel cell assemblies (16), each of the fuel cell assemblies comprising: a first flow field plate (20); a second flow field plate (22); and a membrane electrode assembly (18) interposed between the first and second flow field plates and having an active area (column 3 lines 55-61); a plurality of registration apertures called headers (42, 46, 52, 56) defined in each of the MEA, the first flow field plate and the second flow field plate, the respective registration apertures or headers situated within non-active areas of the MEA when the first and second flow field plates and the MEA are

axially aligned within the stack assembly, the registration apertures having an inner surface (column 6 lines 24-32); and a plurality of registration posts or tie rods (60a, 60b, 60c, 60d) configured for reception within the plurality of apertures or headers, each of the registration posts or tie rods having an outer surface differing in shape from a shape of the inner surface of the registration apertures or headers, the inner surface of the registration apertures or headers contacting the outer surface of the registration posts at a plurality of discrete press fit locations. The inner shape of the registration apertures or headers are seen in Figure 1 to be in the shape of squares or rectangles and the outer surface of the registration posts or tie rods are seen to be cylindrical and in direct contact with the inner surface of the headers through which they pass or extend.

With regard to Claims 2, 3, 5, and 6, Gibb et al. disclose in Figure 1, wherein the shape of the outer surface of the tie rods defines a convex curved shape, the shape of the outer surface of the tie rods defines a circular or elliptical shape as can be seen by the rounded rod shape, the shape of the inner surface of the headers defines a polygon or square or rectangular shape, and wherein the shape of the inner surface of the headers defines a polygon and the shape of the outer surface of the tie rods defines a circle or an ellipse.

With regard to Claim 11, Gibb et al. discloses the registration post or tie rod comprising a solid core member formed of a resilient material (column 4 lines 8-10).

With regard to Claims 15 and 16, Gibb et al. disclose the fuel cell stack assembly comprising sets of the fuel cell assemblies (16) and sets of registration posts or tie rods (60a-60d), each of the tie rods associated with two or more of the fuel cell assembly sets

(column 1 lines 64-66) and wherein each of the tie rods extends between opposing end plates (12, 14) of the fuel cell stack (column 6 lines 24-27).

With regard to Claim 17, Gibb et al. disclose in Figure 2, wherein the registration apertures or headers comprise an entrance lead-in and an exit lead-in by having a recessed portion or cavity used for mounting the stack of disc springs which provide compressive force to the stack (column 2 lines 3-5 and column 7 lines 1-2).

With regard to Claim 44, Gibb et al. disclose, in Figure 1, a fuel cell sub assembly (16) for incorporation in a fuel cell stack (10), comprising: a flow field plate (20 or 22); a membrane electrode assembly (18) positioned adjacent the flow field plate and having an active area (column 3 lines 55-61); a plurality of registration apertures called headers (42, 46, 52, 56) defined in each of the MEA and flow field plate, the respective registration apertures or headers situated within non-active areas of the MEA when the flow field plate and the MEA are in axial alignment, the registration apertures having an inner surface (column 6 lines 24-32); and a plurality of registration posts or tie rods (60a, 60b, 60c, 60d) configured for reception within the plurality of apertures or headers, each of the registration posts or tie rods having an outer surface differing in shape from a shape of the inner surface of the registration apertures or headers, the inner surface of the registration apertures or headers contacting the outer surface of the registration posts at a plurality of discrete press fit locations. The inner shape of the registration apertures or headers are seen in Figure 1 to be in the shape of squares or rectangles and the outer surface of the registration posts or tie rods are seen to be cylindrical and in direct contact with the inner surface of the headers through which they pass or extend.

With regard to Claim 45, Gibb et al. disclose the flow field plate being configured as a bipolar flow field plate, wherein one side serves as an anode plate for one cell and the other side of the flow field plate serves as the cathode plate for the adjacent cell (column 1 lines 66-67 and column 2 lines 1-2).

With regard to Claims 46, 47, 49 and 50, Gibb et al. disclose in Figure 1, wherein the shape of the outer surface of the tie rods defines a convex curved shape, the shape of the outer surface of the tie rods defines a circular or elliptical shape as can be seen by the rounded rod shape, the shape of the inner surface of the headers defines a polygon or square or rectangular shape, and wherein the shape of the inner surface of the headers defines a polygon and the shape of the outer surface of the tie rods defines a circle or an ellipse.

With regard to Claim 53, Gibb et al. discloses the registration post or tie rod comprising a solid core member formed of a resilient material (column 4 lines 8-10).

With regard to Claim 56, Gibb et al. disclose in Figure 2, wherein the registration apertures or headers comprise an entrance lead-in and an exit lead-in by having a recessed portion or cavity used for mounting the stack of disc springs which provide compressive force to the stack (column 2 lines 3-5 and column 7 lines 1-2).

With regard to Claims 57, 60 and 61, Gibb et al. disclose in Figure 1, wherein the registration posts or tie rods have a length greater than a total height of the flow field plate and the MEA, a length greater than the total height of more than two sets of MEA and flow field plates and wherein each of the tie rods extends through a portion of the flow field plate, the MEA, and at least a portion of the flow field plate of an adjacently positioned fuel cell sub-assembly (column 1 lines 64-67 and column 2 lines 1-5) because when connected

in series, multiple fuel cell sub-assemblies are held together in the assembled state by tie rods.

With regard to Claim 71, Gibb et al. disclose a method of forming a fuel cell stack assembly (10), comprising: providing a first flow field plate (20), a second flow field plate (22), and a membrane electrode assembly (18) having an active area (column 3 lines 55-61), a plurality of registration apertures called headers defined in each MEA, the first flow field plate, and the second flow field plate; aligning the first and second flow field plates and the MEA so that the respective registration apertures or headers are in axial alignment, the registration apertures or headers having an inner surface (column 6 lines 24-32); providing a plurality of registration posts or tie rods (60a, 60b, 60c, 60d) having an outer surface differing in shape from a shape of the inner surface of the registration apertures or headers; and inserting the plurality of registration posts or tie rods into the plurality of registration apertures or headers so that the inner surface of the headers contact the outer surface of the registration posts at a plurality of discrete press fit locations, which can clearly be seen in Figure 1.

With regard to Claims 74, 76 and 77, Gibb et al. disclose in Figure 1, wherein the shape of the outer surface of the tie rods defines a circular or elliptical shape as can be seen by the rounded rod shape, the shape of the inner surface of the headers defines a polygon or square or rectangular shape, and wherein the shape of the inner surface of the headers defines a polygon and the shape of the outer surface of the tie rods defines a circle or an ellipse.

***Claim Rejections - 35 USC § 103***

5. Claims 4, 7-10, 12, 48, 51-52, 54 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibb et al. (US 5,484,666), as applied to Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 above.

Gibb et al. disclose the fuel cell stack assembly, the fuel cell sub-assembly for incorporation in a fuel cell stack assembly, and a method of forming a fuel cell stack assembly in paragraph 4 above.

Gibb et al. do not disclose wherein the shape of at least one of the inner surface of the registration apertures and the outer surface of the registration posts defines a generally curved shape comprising a plurality of concave or protruding portions, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a first polygon, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines a second polygon, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a circle, and the shape of the other of the inner surface of the registration apertures and the outer surface of the registration posts defines an ellipse, wherein the shape of the inner surface of the registration apertures defines a triangle, and the outer surface of the registration posts defines a circle, wherein the shape of the inner surface of the registration apertures defines a circle, and the registration posts defines a core member and a plurality of protrusions outwardly projecting from the core member, wherein the shape of one of the inner surface of the registration apertures and the outer surface of the registration posts defines a triangle, and the shape of the other of the inner surface of the registration apertures and the outer surface of the



registration posts defines a circle. Gibb et al. also do not disclose wherein the registration posts comprise a hollow core member. It would have been an obvious matter of design choice to provide the registration apertures and registration posts in different shapes, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1996).

6. The rejection of Claims 18, 58-59, 62 and 63 under 35 U.S.C. 103(a) as being unpatentable over Gibb et al. (US 5,484,666), as applied to Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 above, and in further view of Mease (US 6,358,641 B1), are maintained. The rejection is repeated below for convenience.

Gibb et al. disclose the fuel cell stack assembly, the fuel cell sub-assembly for incorporation in a fuel cell stack assembly, and a method of forming a fuel cell stack assembly in paragraph 4 above. Gibb et al. do not disclose wherein protrusion of the registration posts from a first fuel cell assembly facilitates identification of the second flow field plate of the first fuel cell assembly as an anode plate or a cathode plate of the first fuel cell assembly and wherein the registration posts of a first fuel cell sub-assembly facilitate registration between the first fuel cell sub-assembly and a flow field plate of a second fuel cell sub-assembly wherein the registration posts have a length greater than a total height of the flow field plate and MEA, but less than a total height of two sets of the flow field plates and MEAs, and wherein the registration posts have a length greater than a total height of two sets of the flow field plates and MEAs, but less than a total height of 5 sets of the flow field plates and MEAs.

Mease discloses in Figure 3, a fuel cell stack (10) including plate modules (12) that may be stacked together to form a fuel cell stack. Each plate module is formed of an anode and cathode with an MEA sandwiched in between (column 1 lines 28-40) and including at least one alignment pin (14) that extends through alignment holes (15). The alignment pins are used to align plates (6) of the plate modules by facilitating the identification of the plate as being an anode plate or a cathode plate in a process in which the shafts of the alignment pins extend through the diagonally opposed holes (15c, 15d) of the plate module and partially extend into the holes (15c, 15d) of a plate that do not include captured pins (column 4 lines 29-47). The alignment pins are also used to align plates of the plate modules (column 3 lines 8-10) wherein the alignment pins facilitate registration between the flow field plate of one fuel cell and the flow field plate of a second fuel cell (see Figure 4). Alignment pins may be shorter or longer depending on the number of plate modules in the stack. The plate modules have four alignment holes that are located near the four corners of the plate. Two pins may extend through diagonally opposed holes of each plate module to mate with an adjacent plate module. Because upper ends of the pins may extend beyond the upper face of the plate module the upper ends may mate with corresponding alignment holes of adjacent plate modules. By assembling the fuel cell stack in this manner the alignment pins have a length greater than a total height of the flow field plate and MEA, but less than a total height of two sets of the flow field plates and MEAs when stacking only 2 sets of plate modules together because the next plate module may not have corresponding alignment holes (column 4 lines 4-28), and a length greater than a total height of two sets of the flow field plates and MEAs, but less than a total height of 5 sets of the flow field plates and MEAs when stacking only 5 sets of plate modules

together. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use registration posts or alignment pins that would facilitate the registration between fuel cell assemblies and between flow field plates and anode or cathode plates of the Gibb et al. fuel cell assembly, because Mease teaches aligning plate modules so that the alignment pins don't slip out of the alignment holes and being able to align several plate modules with a "self-capturing" feature which captures the alignment pin between the plates of the module so that each plate module can be tested separately for problems such as leakage (column 2 lines 64-67).

7. The rejection of Claims 19-23 under 35 U.S.C. 103(a) as being unpatentable over Gibb et al. (US 5,484,666), as applied to Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 above, and in further view of Gamo et al. (US 5,976,725), are maintained. The rejection is repeated below for convenience.

Gibb et al. disclose the fuel cell stack assembly, the fuel cell sub-assembly for incorporation in a fuel cell stack assembly, and a method of forming a fuel cell stack assembly in paragraph 4 above. Gibb et al. does not disclose an automobile, a computer, an auxiliary power system and a residential heat and electricity cogeneration unit, wherein one or more of the fuel cell stack assemblies are incorporated in a fuel cell power unit configured to supply power to a load, the computer, auxiliary power system and residential heat and electricity cogeneration unit.

With regard to Claim 19, Gamo et al. do not disclose wherein the fuel cell stack assemblies are incorporated into the fuel cell power unit configured to supply power to an automobile, but it would have been obvious to use the fuel cell assemblies of Gibb et al.

into an automobile, because Gamo et al. teach the fuel cell being useful as a power source to supply electrical energy to a load.

With regard to Claims 20-23, Gamo et al. disclose a fuel cell system as an ideal power source for laptop computers (column 10 lines 55-59), a power generator for outdoor life, which would be an auxiliary power system (column 12 lines 20-21), and other electric appliances in which the heat produced would not have adverse thermal effects (column 10 lines 63-65). Therefore, at the time of the invention it would have been obvious to use the fuel cell system of Gibb et al. with other applications, because Gamo et al. teach the fuel cell being useful as the power source for applications in which smaller size and longer time of operation are necessary and demanded.

#### ***Allowable Subject Matter***

8. Claims 13-14, 55 and 72-73 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: the closest prior art, Gibb et al., do not teach or fairly suggest wherein the registration posts comprise a hollow outer member and a solid core member, the hollow outer member configured to receive the solid core member, and; where in the registration posts comprise a compressible hollow outer member and a solid core member, the solid core member having an outer diameter greater than an inner diameter of the hollow outer member, the solid core member compressibly deforming the hollow outer member when the solid core member is positioned within the hollow outer member.

***Response to Arguments***

10. Applicant's arguments, see pages 21-23, filed March 5, 2007, with respect to the rejection of Claims 1-3, 8, 11-16, 19, 21, 44, 46-47, 53-55, 57, 60-61 and 71-74 as being anticipated by Sugita et al. (US 6,620,540), have been fully considered and are persuasive. The rejection of these claims has been withdrawn. However, the rejection of Claims 1-3, 5-6, 11, 15-17, 44-47, 49-50, 53, 56-57, 60-61, 71, 74 and 76-77 under 35 U.S.C. 102(b) as being anticipated by Gibb et al. (US 5,484,666) are maintained.

11. *Applicant's principal arguments are:*

*(a) Gibb et al. do not disclose the inner surface of the header openings do not contact the outer surface of the tie rods at a plurality of discrete locations and the header openings and outer surface of the tie rods do not provide for a press-fit relationship.*

In response to Applicant's arguments, please consider the following comments:

(a) In Figure 1, Gibb et al. disclose a press-fit relationship between the headers (42, 56) and the tie rods (60a, 60d), respectively. This can be seen by the way the tie rods press up against the inner edges of the headers, leaving very little, if any, room for movement. It can also be seen that the inner surface of the header openings contact the outer surface of the tie rods at a plurality of discrete locations. For example, the cylindrical surface of the round tie rods is pressed up against the inner walls of a square header, allowing for the tie rods to make

contact along only a small or discrete portion of each of the four inner walls of the headers.

### ***Conclusion***

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571) 272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karie O'Neill  
Examiner  
Art Unit 1745

KAO

  
DAH-WEIYUAN  
PRIMARY EXAMINER